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C.J. FEARE¹
J.R. ALLAN¹
A. GRETTON²¹Central Science Laboratory (MAFF),
Tangley Place, Worplesdon, Surrey GU3 3 LQ, U.K.
²International Council for Bird Preservation, Fregate Island,
Seychelles.

REFERENCES

- ALI S. & S.D. RIPLEY (1972): Handbook of the birds of India and Pakistan. Oxford: Oxford University Press.
- FEARE, C.J. (1976a): Communal roosting of the mynah *Acridotheres tristis*. *J. Bombay nat. Hist. Soc.* 73: 525-527.
- FEARE, C.J. (1976b): Desertion and abnormal development in a colony of sooty terns infested with virus-infected ticks. *Ibis* 118: 112-115.
- GREIG-SMITH, P.W. (1982): Behaviour of birds entering and leaving communal roosts of Madagascar Fodies *Foudia madagascariensis* and Indian Mynahs *Acridotheres tristis*. *Ibis* 124: 529-534.
- HAILS, C.J. (1985): Bird pests, management techniques and the status of bird pests in Singapore. *J. Singapore Nat. Acad. Sci.* 14: 15-23.
- KANG, N. (1992): Radiotelemetry in an urban environment — a study of mynas (*Acridotheres* spp.) in Singapore. In: I.M. Priede & S.M. Swift (eds) Wildlife telemetry. Proceedings of the 4th International Conference on Radiotelemetry. Chichester: Ellis Harwood.
- LEVER, C. (1987): Naturalized birds of the World. Harlow: Longman.
- SENGUPTA, S. (1982): The Common Myna. S. Chand & Co., New Delhi.
- WARD, P. & A. ZAHAVI (1973): The importance of certain assemblages as "information centres" for food finding. *Ibis* 115: 517-534.
- YOM-TOV, Y. (1979): The disadvantage of low positions in communal roosts: an experiment to test the effects of droppings on plumage quality. *Ibis* 121: 331-333.

20. FLYCATCHING BY SUNBIRDS *NECTARINIA ASIATICA* (LATHAM)

I happened to spend a week at Vazhachal R.F. (Trissur District, Kerala) and was able to observe a rather remarkable behaviour among sunbirds. The immediate environs of our quarters were mostly teak plantations, highly degraded secondary forest and a small riparian patch fringing the river. Here by the river side stood a large *Xylia xylocarpa* tree, the canopy of which was more or less completely draped with a climber (species unidentified) in bloom. The blossoms attracted large numbers of insects. Four Purple sunbirds (*Nectarinia asiatica*) — three males in eclipse plumage and a solitary female were seen on the tree. Every few seconds one of them would launch an aerial sally, catch an insect and return to its perch. The method of capture was exactly in the typical flycatcher and the sunbirds seemed as adept and dexterous as flycatchers. Some insects were pursued for considerable distances before they were captured. Close scrutiny through binoculars revealed that the sunbirds had a high percentage of success.

I was able to observe this interesting behaviour on three consecutive days, namely 28-12-93, 29-12-93 and

30-12-93. All three occasions were on mornings at about 7 a.m. to 8 a.m. Frequently a pair of loten's sunbird (*Nectarinia lotenia*) and a few Purple rumped sunbirds (*Nectarinia zeylonica*) also joined the flycatching. Once I counted 11 sunbirds of the three species sallying for insects. While the loten's sunbird and Purple rumped sunbird left after a few minutes, the four Purple sunbirds stayed on assiduously intent on capturing insects. The birds were very vocal chattering excitedly. Rarely one bird chased away another, but otherwise no aggressive behaviour was observed.

According to the HANDBOOK, Purple sunbirds do indulge in flycatching, but nothing is said regarding this habit of either loten's or Purple rumped sunbird. At Vazhachal I could observe all three species actively engaged in flycatching. It was strange that not even once were they observed probing the flowers of the creeper for nectar, a favourite food of sunbirds.

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MANOJ V. NAIR

34, Thoppil Nagar, Kumarapuram, Trivandrum, Kerala 695 011.

21. NOTES ON FEEDING HABITS AND SOME MORPHOLOGICAL FEATURES OF THE BOSTAMI TURTLE, *ASPIDERETES NIGRICANS* (ANDERSON)

(With a text-figure)

INTRODUCTION

Aspideretes nigricans (Anderson), locally called 'gazari', 'madari' or Bayazid Bostameer kachim

(kachim = turtle) after the Mohammedan shrine of Sultan al-Arefin Hazrat Bayazid Bistami (locally pronounced Bostami) is endemic to Bangladesh. Little is known about this species (see Khan 1980, 1982;

TABLE 1
ECONOMICS INVOLVED IN THE FEEDING OF THE BOSTAMI TURTLE

	Bread (kg.)		Banana (no.)		Offal (kg.) offered/ eaten	Total cost	
	sold	eaten	sold	eaten		sold	eaten
Daily sale (\pm SD)	65 \pm 47	24	1032 \pm 313	271	0.63	-	-
Price (in Taka)	497	84	341	89	11.71	850	287
(in US \$)	17	6	11	3	0.39	28	9
Yearly sale (\pm SD)	23,531	8,783	376,680	98,915	330.00	-	-
Price (in Taka)	181,405	67,708	124,304	32,642	5,610.00	311,319	105,960
(in US \$)	6,047	2,257	4,143	1,008	187.00	10,377	3,532

Ahsan and Haque 1987, Ahsan *et al.* 1991, Ahsan and Saeed 1989, 1992). This paper deals with food habits and feeding behaviour and economics of the species and describes some morphological features.

STUDY AREA AND METHODS

The species is restricted to a pond attached to a shrine situated about 6.5 km to the north-west of Chittagong town (22°11' N and 91°09' E). The study was carried out between January and July 1984. The food habits and feeding behaviour were observed from the main platform of the pond. Feeding was defined when an individual was actually seen swallowing a food item. The time spent in major activities (feeding, resting, floating and moving) were noted for all focal animals. Feeding was noted for all focal animals (males and females separately) at intervals of 5 minute scan samples. Each animal in each scan was considered as one observation. Data were collected for 2 to 3 days a week from 0700 to 1800 hours randomly and only feeding is described in this paper. Food assessment was done from the data collected by personal communication with the local shops. Some of the offal (mainly cattle lung), fed to the turtles, is brought from outside the shrine area. Hence the quantity fed has been estimated from visual observations. To find out their food preference we offered bread, banana, offal, puffed rice, cooked rice, and 'chapati' to the turtles and observed that all the food offered at a time to the turtles were not eaten except for offal.

Morphological features have been described from live specimens observed in the pond. Osteological features were studied from carapace, plastron and skulls collected from the turtle burial ground on the bank of the Bayazid Bostami pond. Skeletal material has been deposited at the Museum of the Zoology Department, Chittagong University.

RESULTS

Food Habits and Feeding Behaviour: The Bostami turtles are dependant on food supplied by visitors and pilgrims. The main food consists of bread, banana and offal; but puffed rice, chapati, and cooked rice and meat, are also occasionally offered. The turtles have no scheduled feeding time, but spend more time feeding in the mid-and late morning and afternoon. Thus they spend most of the day alternately feeding and resting above or under water.

Proportion of time spent feeding: Of 15,933 observations (1,938 for feeding) during 633 scanning over 61 hours in 22 days, the turtle spent 12.2% of day time in feeding. The food involved in 37.4% of this time was bread, 26.3% on banana and 36.4% on offal.

Male and female turtles spent 65.2% and 34.8%, 59.4% and 40.6% and 63.8% and 36.4% of time eating bread, banana, and offal respectively. It thus appears that males spend more time feeding than females.

Economics of feeding: From the average amount of bread and banana sold daily from the 11 shops during January to July 1984, we estimated the yearly sale and cost (Table 1). The annual expenditure on food, including offal which are brought from outside, for the Bostami turtle is about Taka 3,11,153 (= US \$ 10,372) (Table 1). The amount of food eaten, especially bread and banana, by the turtles was nearly the same as the amount of time they spent feeding and therefore, their cost was also estimated (Table 1). On the yearly 'oros' (death anniversary of the saint), 10-15 cattle are slaughtered and their offal are offered to the turtles, the meat being eaten by the pilgrims, but these have been excluded from the above estimate.

Morphology of *Aspideretes nigricans*: Meylan (1987) has described the osteology of the species. What follows is a description of gross morphology. An ovipositing female was considered to be adult. Specimens

TABLE 2
MEASUREMENTS OF THE BOSTAMI TURTLE

Parameters (cm)	Adult male	Adult female
Curved width of carapace	52.85 ± 9.08	44.50 ± 11.05
Straight width of carapace	42.65 ± 8.27	34.64 ± 6.53
Shell height	12.28 ± 2.48	7.80 ± 1.03 (nesting)
Straight length	54.89 ± 9.05	37.70 ± 4.08 (nesting)
Shell height	-	14.90 ± 2.47 (Non-nesting)
Straight length	-	60.25 ± 5.74 (Non-nesting)
Distance between hind limb	17.37 ± 3.93	14.45 ± 2.61 (Nesting)
	-	23.95 ± 2.11 (Non-nesting)
Maximum length of carapace	78	74
Maximum width of carapace	66	68
Maximum wet body weight (kg)	54	50

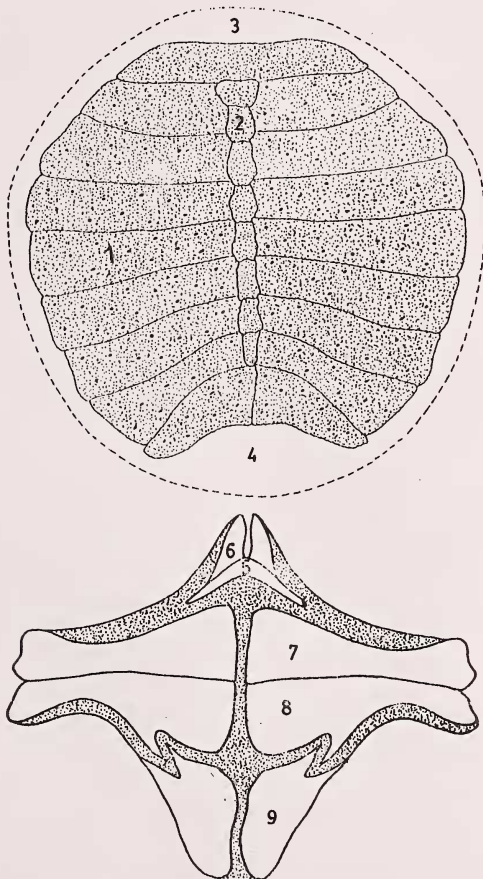


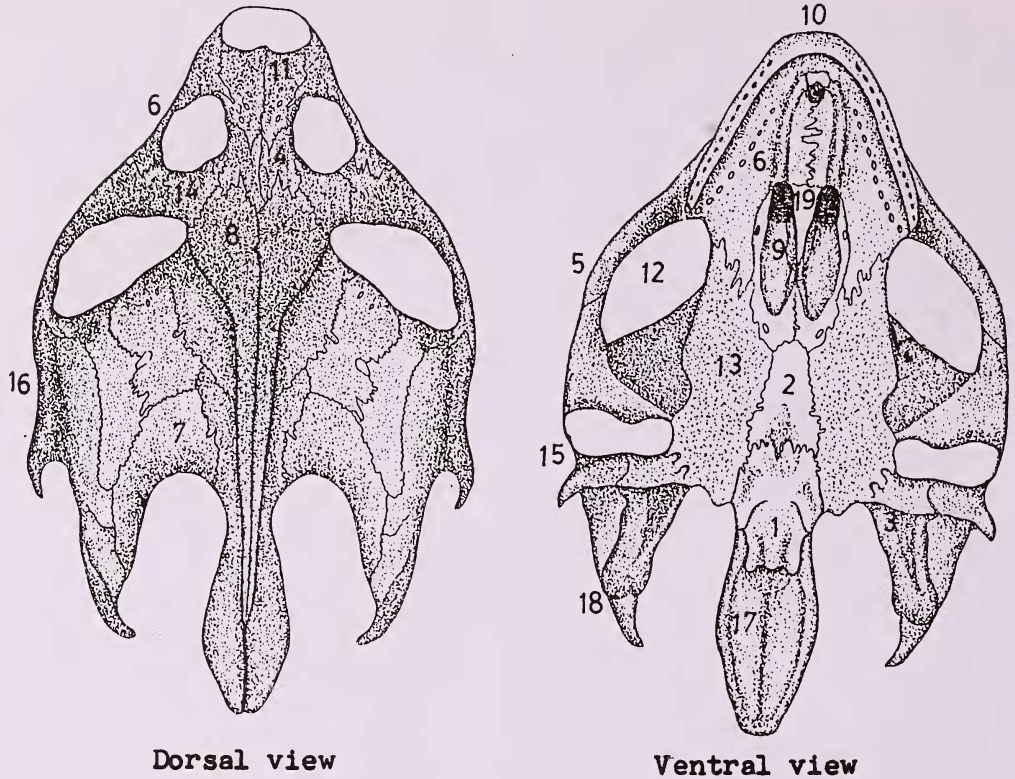
Fig. 1a. Carapace and plastron of *Aspideretes nigricans*
1. Costal; 2. Neural; 3. Nuchal; 4. Pygal; 5. Entoplastron;
6. Epiplastron; 7. Hyoplastron; 8. Hypoplastron;
9. Xiphiplastron

much smaller in body size than ovipositing adults were regarded as juveniles. At the caudal extremity of the carapace, the cartilaginous flap is much extended. The carapace is covered with soft skin. The carapace and plastron are connected by cartilaginous plates. Irrespective of sex ($n=100$), the minimum and maximum values of curved carapace length and width recorded were 39 and 78 cm (mean 62 ± 10.16), and 33 and 71 cm (mean 53.27 ± 9.27) respectively (Ahsan and Saeed 1989). Generally males are larger than females. Adult males and adult females can be differentiated by the following characters (mainly based on Ahsan and Saeed 1989): (1) Tail of females shorter than that of males, the female cloaca not protruding outside the carapace. (2) Carapace of females more rounded than that of males (see Table 2). (3) Males shell height is larger and smaller respectively than that of ovulating and non-ovulating females¹ (see Table 2). (4) Mature males are larger and heavier than mature females² (see Table 2). In the larger specimens a deep longitudinal groove is found in the middle of the carapace (common in large trionychids).

Osteological Features: Carapace Plastron and Skull (Fig. 1a and 1b): The carapace consists of eight pairs of costals plates. Among these, the last one is most developed and in contact throughout the median line. There are two neurals between the first pair of costals. The entire carapace is coarse and vermiculated. There are eight neurals in the middle of the costals. The 8th pair of costals touch each other and are connected with the pygal plate. Neurals broad on the cranial side and

¹ For measurements given in items 3 and 4, ten specimens each of ovulating and non-ovulating females, and males were randomly chosen.

² Measurements after Ahsan and Saeed 1989.



Dorsal view

Ventral view

Fig. 1b: Skull of *Aspideretes nigricans*

1. Basioccipital; 2. Basiphenoid; 3. Exoccipital; 4. Frontal; 5. Jugal; 6. Maxillary; 7. Opisthotic; 8. Parietal; 9. Palatine; 10. Praemaxillary; 11. Praefrontal; 12. Prootic; 13. Pterygoid; 14. Postfrontal; 15. Quadrate; 16. Quadrato jugal; 17. Supraoccipital; 18. Squamosal; 19. Vomer.

become narrower caudally around the costals. The plastron is very large and more or less cross-shaped. Both cranial and caudal sides are blunt and parallel vertebrally. Epiplastra narrowly separated from each other in front of entoplastron. Hyoplastron and hypoplastron connected with each other looking like a single bone. Rostrum of the skull is a little longer than the diameter of the orbit. The inter-orbital region in the adult is as broad as the nasal fossa. The post-orbital arch is one half or less than the diameter of the orbit. The alveolar surface of the upper jaw is flat, with a well-defined median (maxillary) groove between them.

DISCUSSION

Food (bread, banana, offal, puffed-rice, etc.) is brought daily by the visitors and pilgrims to the shrine and offered to the turtles from dawn to dusk. The proportion of time spent in feeding is not constant

throughout the year, varying daily, depending on the number of visitors that offer food.

The Bostami turtle prefer lung and/or other offal to items like bread, banana and puffed-rice. Turtles were recorded swallowing 25-30 medium sized pieces of lung (about 120 gm) within 10 minutes.

It may be mentioned here that hundreds of people make a living in different ways from the shrine — some by selling turtle food, some as caretakers, and many others by begging from the visitors and pilgrims.

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MD. FARID AHSAN
MD. NURUL HAQUE
MD. ABU SAEED

Department of Zoology, University of Chittagong,
Chittagong 4331, Bangladesh.

REFERENCES

- AHSAN, M.F. & M.N.HAQUE (1987): Bostami kachim. *Bangla Academy Bijnan Potrica* (in Bangla). 13(2): 15-39.
- AHSAN, M.F., M.N. HAQUE & C.M. FUGLER (1991): Observations on *Aspideretes nigricans* (Anderson), a semi-domesticated endemic species of eastern Bangladesh. *Amphibia Reptilia* 12: 131-136.
- AHSAN, M.F. & M.A. SAEED (1989): The Bostami turtle, *Trinonyx nigricans* Anderson: population status, distribution, historical background and length-weight relationship. *J. Bombay nat. Hist. Soc.* 86(1): 1-6.
- AHSAN, M.F. & M.A. SASEED (1992): Some aspects of the breeding biology of the Bostami turtle, *Aspideretes nigricans*. *Hamadryad* 17.
- KHAN, M.A.R. (1980): A 'holy' turtle of Bangladesh. *Hornbill* 4: 7-11.
- KHAN, M.A.R. (1982): Chelonians of Bangladesh and their conservation. *J. Bombay nat. Hist. Soc.* 79(1): 110-116.
- MEYLAN, P.A. (1987): The phylogenetic relationships of soft-shelled turtles (Family Trionychidae). *Bull. American Mus. nat. Hist.* 186: 1-101.

22. OCCURRENCE OF THE INDIAN BLACK TURTLE *MELANOCHELYS TRIJUGA* IN SIMBALBARA SANCTUARY, HIMACHAL PRADESH

The Indian black turtle or pond terrapin (*Melanochelys trijuga*) is one of the most common and widespread of the Indian freshwater turtles. Seven subspecies have been described, of which four are distributed within Indian limits, namely peninsular black turtle (*M. t. trijuga*), Cochin black turtle (*M.t. coronata*), Bangladesh black turtle (*M.t. indopeninsularis*) and Sri Lankan black turtle (*M.t. thermalis*). The others, namely the Burmese black turtle (*M.t. edeniana*), Parker's black turtle (*M.t. parkeri*) and Thai black turtle (*M.t. wiroti*) are distributed in Burma, Sri Lanka and Thailand, respectively. Daniel (1983) reported *Melanochelys trijuga* to be a peninsular species (below 20° N latitudes), with a possibility of it occurring further northwards. However, more recent surveys have revealed that it is distributed as far as north-west Bihar (Valmiki Nagar, West Champaran; Moll and Vijaya 1986), Nepal (Royal Chitwan National Park; Dinerstein *et al.* 1987) and in north-eastern India (Assam and Meghalaya; Das 1990). In this paper, we report the occurrence of *Melanochelys trijuga* in Simbalbara Sanctuary, Himachal Pradesh.

Simbalbara is a 19 sq. km sanctuary which lies in the Shiwalik region (Outer Himalaya) in Sirmaur District of Himachal Pradesh. The sanctuary is covered by moist salbearing forests (Type 3C/C₂ of Champion and Seth 1968) and is the westernmost limit of sal (*Shorea robusta*) distribution in India. The valleys and low-lying reverine areas have sal forests dominated by *Shorea robusta* - *Ougeinia ougeinensis* — *Buchanania lanzan* associates, whereas, the hills have mixed forests dominated by *Anogeissus latifolia*

— *Acacia catechu* — *Boswellia serrata* associates.

On 18th April 1993, one of the authors (A.P.) collected a specimen of *Melanochelys trijuga* in the sal forest. This specimen was found about 10 m from a perennial stream at around 14:15 hours (alt. 450 m.s.l.). The turtle, a male was apparently feeding when first located in a thick layer of sal leaves. It was photographed and released. The posterior marginals were broken indicating a possible attempt of predation on this individual. The turtle excreted on being handled, the faeces showing remains of leaves, ants and crustaceans. The turtle was active and moving although the temperature was 41° C.

On 6th June 1993, the second author (T.J.) collected and photographed another live specimen of the same species. This individual was also an adult male and was located around 5 m from a stream, covered with sal leaves. The specimen had a broken marginal scale and was found c. one kilometre upstream from where the former specimen was located. Its morphometric measurements were as follows: straight carapace length: 194 mm, straight carapace width: 142 mm and shell height: 68 mm. Enquiries with locals about the frequency of its sightings, revealed that this species is common all along the edge of the river and in the forested regions with streams and pools, in Simbalbara Sanctuary.

The seven subspecies that are currently recognized, are differentiated predominantly on head coloration. Although the head was blackish in colour, no distinct characteristics for subspecific identification were observed. Moll and Vijaya (1986) had indicated that the subspecies *M.t. indopeninsularis* may be